

A NEW SPECIES OF CHIGGER, GENUS *EUSCHOENGASTIA*  
(ACARINA, TROMBICULIDAE), WITH NOTES  
ON OTHER SPECIES OF CHIGGERS FROM  
THE SANTA ANA MOUNTAINS,  
CALIFORNIA

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Examination of available specimens of several species of mammals, from the Santa Ana Mountains and adjacent areas in Orange and Riverside counties, California, has revealed larvae of eleven species of chiggers. One species in the Genus *Euschoengastia* is described as new, and range extensions of more than 200 miles to the southeast from previous records are reported for five species. New host records are listed, along with notes on the attachment sites and their seasonal occurrence. Only the characteristics which are at variance with other published information are described. Selected scutal measurements are included for each species.

The Santa Ana Mountains are located in both Orange and Riverside counties with the county line nearly bisecting the range. The mountains are ten miles east of Santa Ana and some twenty miles from the Pacific Ocean. The range covers nearly 400 square miles and has an elevation of 5600 feet at its highest point.

The climate is affected by the position of the mountains, with southwesterly winds driving the rain-bearing clouds at a right angle to the length of the mountains. The wet season begins in December and ends sometime in April. Over 90 per cent of the rainfall occurs during these months. The rest of the year is considered the dry season. For additional information, especially on the biota, the reader should refer to Pequegnat (1951).

ACCOUNTS OF THE SPECIES

The terminology used throughout this paper is that of Wharton, *et al.* (1951), with few modifications. All of the measurements are in microns. All of the larvae were studied by means of a phase contrast microscope, with specimens mounted on slides in polyvinyl alcohol L-P medium. Readers are referred to Brennan and Jones (1959) and

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Vercammen-Grandjean (1960) for certain taxonomic changes and for keys including the species listed below.

*Odontacarus linsdalei* (Brennan and Jones)

*Specimens examined.* Total, 17 larvae, as follows:

RIVERSIDE CO.. 2½ mi. SW Lake Mathews, *Dipodomys agilis*, 16 April 1957.

*Remarks.* The above locality represents a range extension of 285 airline miles to the southeast from the type locality in Monterey County, California. Some variation was noted in the dorsal body setal formula, 8-8-8-10-12-10-6-2-2 in above, as compared to the holotype with 10-10-8-10-10-8-6-2-2. Averages of scutal measurements of 4 specimens are as follows: AW-55, PW-75, SB-25, ASB-26, PSB-18, AP-17, AM-35, AL-37, PL-39, S-72.

*Neotrombicula californica* (Ewing)

*Specimens examined.* Total, 59 larvae, as follows:

ORANGE CO.. Modjeska Canyon. *Neotoma fuscipes*, 19 Jan. 1957 (19), *Peromyscus californicus*, 19 Jan. 1957 (2), 12 March 1957 (3). RIVERSIDE CO.. 2¾ mi. S. 4 mi. W Corona. Tin Mine Canyon. *Neotoma fuscipes*, 17 March 1956 (26); 3 mi. SW Lake Mathews. *Neotoma lepida*, 23 Feb. 1957 (7).

*Remarks.* Larvae were found attached to the external auditory canal and the proximal areas of the pinna. Averages of scutal measurements of 4 specimens from Orange Co. are as follows: AW-66, PW-80, SB-25, ASB-34, PSB-25, AP-28, AM-38, AL-43, PL-43, S-83.

*Neotrombicula dinehartae* (Brennan and Wharton)

*Specimens examined.* Total, 18 larvae, as follows:

ORANGE CO.. 1 mi. E O'Neill Park, Trabuco Canyon. *Peromyscus californicus*, 18 Nov. 1956.

*Remarks.* This locality represents a range extension of 285 airline miles to the southeast from the type locality in Monterey County. Chiggers were found attached to the external auditory canal with a few scattered on the ear pinna. Averages of scutal measurements of 4 specimens are as follows: AW-65, PW-89, SB-23, ASB-36, PSB-23, AP-32, AM-39, AL-55, PL-62, S-78.

*Miyatrombicula scottae* (Brennan)

*Specimens examined.* Total, 8 larvae, as follows:

ORANGE CO., 1 mi. E O'Neill Park, Trabuco Canyon, *Peromyscus californicus*, 18 Nov. 1956.

*Remarks.* This record represents a range extension of 285 airline miles to the southeast from Monterey County. Averages of scutal measurements of 4 specimens are as follows: AW-39, PW-44, SB-12, ASB-20, PSB-26, AP-22, AM-24, AL-21, PL-31, S-32. Most of these measurements are slightly smaller than those given for the holotype.

*Euschoengastia frondifera* Gould

(FIGURES D AND E)

*Euschoengastia frondifera* Gould, 1956: 53.

*Specimens examined.* Total, 34 larvae, as follows:

RIVERSIDE CO., 8 mi. SSE Lake Mathews, *Neotoma lepida*, 22 Dec. 1956 (12); 3 mi. SW Lake Mathews, *Neotoma lepida*, 23 Feb. 1957 (21). ORANGE CO., Modjeska Canyon, *Peromyscus californicus*, 14 May 1957 (1).

*Remarks.* See remarks under *E. otophila* for comparison of the two species. Averages of scutal measurements from 7 types (Los Angeles Co.) and from 4 specimens from Riverside Co., in that order, are as follows: AW-62, 64, PW-80, 79, SB-30, 31, ASB-22, 18, PSB-16, 12, AP-14, 13, AM-26, 22, AL-27, 30, PL-44, 43, S-31, 34. Larvae were found attached to the external auditory canal.

***Euschoengastia otophila*, NEW SPECIES**

(FIGURES A-C, F AND G)

*Type data.* Holotype and 30 paratypes from 1 mile east of O'Neill Park, Trabuco Canyon, Orange County, California, host *Peromyscus californicus*, field number RL561118-1, collected 18 November 1956, by R. B. Loomis. Additional paratypes from the same locality are listed below. The holotype and two paratypes will be deposited in the Rocky Mountain Laboratory, Hamilton, Montana. Paratypes, now in the collection of R. B. Loomis, will be distributed to the United States National Museum, the University of Kansas and to other appropriate institutions and individuals.

*Diagnosis.* Resembling *Euschoengastia micheneri* Gould, *E. lanceo-*

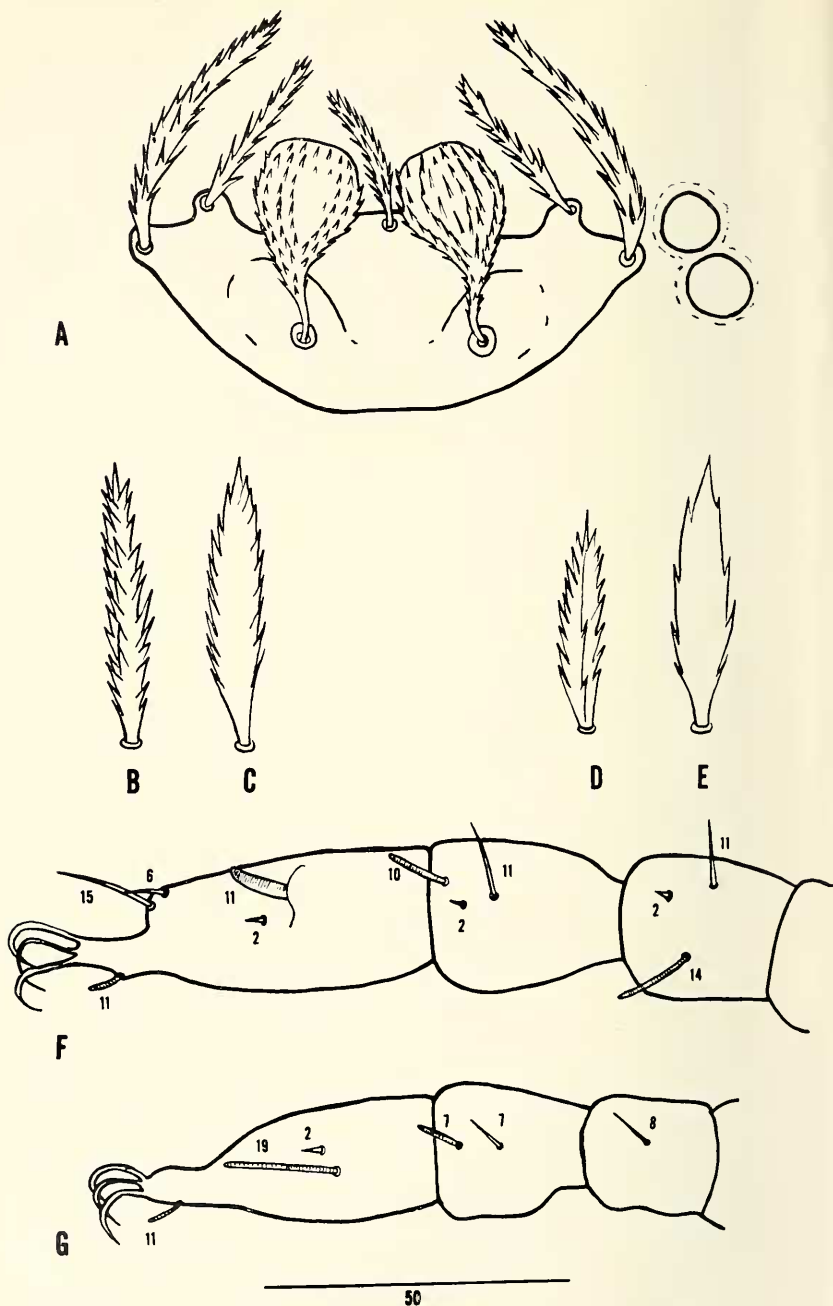


PLATE I. Numbers adjacent to the nude setae represent measurements in microns. *Euschoengastia otophila* new species. *Figure A.* Scutum and eyes. *Figure B.* Dorsal seta of the first posthumeral row. *Figure C.* Posterior dorsal seta. *Figure F.* Leg I, showing nude setae. *Figure G.* Leg II, showing nude setae. *Euschoengastia frondifera* Gould. *Figure D.* Dorsal seta of the first posthumeral row. *Figure E.* Posterior dorsal seta.

*lata* Brennan and Beck, *E. frondifera* Gould, *E. nihi* Brennan and Jones, and *E. romola* Brennan and Jones in having broadly expanded dorsal setae, trifurcate palpal claw and lacking tibiala III. Differs from *E. micheneri* and *E. romola* in having subterminala I; from *E. lanceolata* and *E. micheneri* by nude or forked lateral setae on palpal tibia; from *E. nihi* by presence of genuala III; and from *E. frondifera* by difference in shape of dorsal setae, dorsal setal formula 2-10-10-; and longer humeral setae ( $40\mu$ ).

*Description of holotype.* (With differences noted in paratypes in parentheses.)

Body: Small, nearly round. Color white in life. Two pairs of eyes widely separated and ocular plate lacking. (Body length and width varies from 246/265 to 379/333, average 260/270, in 10 specimens.)

Gnathosoma: Cheliceral base with few scattered puncta posteriorly. Blade slender, typical, with tricuspid cap. Palpal femoral and genual setae with numerous branches, dorsal and ventral palpal tibial seta nude or forked. Palpal tibial claw trifurcate. Tarsus with 7 branched setae and moderate tarsala ( $8\mu$ ). Galeal seta with 4 to 5 branches.

Scutum: More than twice as wide as long with scattered puncta medially. Anterior and posterior margins of scutum sinuous; lateral margins concave, diverging posteriorly. Sensillae clavate, short stemmed and bases slightly posterior to bases of PL's. AL's subequal and much shorter than PL's. AM slightly shorter than AL's. Measurements of holotype as follows: AW-59, PW-76, SB-26, ASB-24, PSB-11, AP-12, AM-23, AL-28, PL-41, S-31. Measurements of 4 types, averages and extremes, are as follows: AW-57 (55-59), PW-75 (74-77), SB-26 (23-29), ASB-21 (18-24), PSB-11 (11-12), AP-13 (12-14), AM-21 (20-23), AL-27 (26-28), PL-41 (39-43), S-30 (30-31).

Body setae: (see Figs. B and C) Approximately 50 broad dorsal setae with numerous heavy setules. Dorsal setae of first row measuring 44 becoming progressively shorter ( $36\mu$ ) and thicker posteriorly. One pair of broad humeral setae ( $40\mu$ ). Dorsal setal formula of holotype 2-10-10-10-8-6-4 (dorsal formula varying from 2-10-10-10-8-6-4 to 2-11-10-8-6-4-2). Ventral setae numbering from 34 to 40; small ( $23\mu$ ) and not broadly expanded. Last two posterior rows resemble dorsal setae. Sternal setae (2-2) measuring  $38\mu$  and  $29\mu$  respectively.

Legs: Coxae lightly punctate. Tarsala II longer than tarsala I, ratio 1.4 to 1.7. Tibialae I and II bluntly tipped. Arrangement of branched setae similar to *E. frondifera* Gould, 1956. (See Figs. F and G). Nude sensory setae (and measurements) as follows: Leg I, with 2 genualae ( $11-13\mu$ ), microgenuala; 2 tibialae ( $11-13\mu$ ), microtibiala; mid-

dorsal tarsala (11-12 $\mu$ ), microtarsala, subterminala, parasubterminala and pretarsala. Leg II, with genuala (6-7 $\mu$ ), 2 tibialae (6-8 $\mu$ ), long mid-dorsal tarsala (17-19 $\mu$ ), proximal anterior microtarsala, and pretarsala. Leg III, with genuala (7-8 $\mu$ ) (tibiala absent).

*Specimens examined.* Total, 62 larvae, as follows: Holotype and 61 paratypes, all from ORANGE CO., 1 mi. E O'Neill Park, Trabuco Canyon. *Peromyscus californicus*, 18 Nov. 1956 (30); Modjeska Canyon, *Peromyscus californicus*, 19 Jan. 1957 (18); 12 March 1957 (6); and 14 May 1957 (8).

*Remarks.* This species closely resembles *E. frondifera* but is separated by the following characters. The dorsal setae are not flattened dorsoventrally but are broad with numerous thickened setules. The dorsal formula is variable in both species but *E. otophila* maintains a 2-10-10- as compared to *E. frondifera* with a 2-14-14. Humeral setae are much longer, 40 $\mu$  as to 31 $\mu$  in *E. frondifera*. The lateral palpal tibial seta is usually forked and occasionally nude whereas in *E. frondifera* it is usually nude and occasionally forked. One specimen of *E. frondifera* was found with a series of *E. otophila* from Modjeska Canyon.

*Peromyscus californicus* had heavy infestations of these larvae on the pinnae. Two mice had more than 100 chiggers on each of their ears.

#### *Euschoengastia terrestris* Gould

*Specimen examined.* Total, 1 larva, from RIVERSIDE CO., 2½ mi. SW Lake Mathews, *Dipodomys agilis*, 16 April 1957.

*Remarks.* This locality represents a range extension of 225 airline miles to the southeast of the localities in Fresno, Monterey, San Mateo, and Napa counties as reported by Gould (1956:56). Scutal measurements of the single specimen are: AW-54, PW-66, SB-20, ASB-21, PSB-21, AP-23, AM-25, AL-24, PL-36, S- lacking. The larva was removed from the external auditory canal.

#### *Euschoengastia californica* (Ewing)

*Specimens examined.* Total, 150 larvae, as follows: ORANGE CO., 1 mi. E O'Neill Park, Trabuco Canyon. *Peromyscus californicus*, 18 Nov. 1956 (23); Modjeska Canyon, *Neotoma fuscipes* (11), *Peromyscus californicus* (22), 19 Jan. 1957; *Peromyscus californicus*, 12 March 1957 (39); and 4 May 1957 (8). RIVERSIDE CO., 2¾ mi. S. 4 mi. W Corona, *Neotoma fuscipes*, 17 March 1956 (5); 8 mi.

SSE Lake Mathews, *Neotoma lepida*, 22 Dec. 1956 (19); *Neotoma lepida* (21) and *Peromyscus maniculatus* (23), 23 Feb. 1957.

*Remarks.* Averages of scutal measurements of 4 specimens from Orange Co. are as follows: AW-43, PW-55, SB-18, ASB-26, PSB-13, AP-13, AM-32, AL-50, PL-47, S-31. The hosts were found with heavy infestations in the external auditory canals and the chiggers were grouped in clusters on the inner part of the ear pinna.

*Euschoengastia radfordi* Brennan and Jones

*Specimens examined.* Total, 6 larvae, as follows:

ORANGE CO., Modjeska Canyon, *Neotoma fuscipes*, 19 Jan. 1957 (5). RIVERSIDE CO., 3 mi. SW Lake Mathews, *Neotoma lepida*, 23 Feb. 1957 (1).

*Remarks.* Averages of scutal measurements of 4 specimens are as follows: AW-52, PW-75, SB-25, ASB-25, PSB-11, AP-20, AM-28, AL-47, PL-36, S-29.

*Euschoengastia criceticola* Brennan

*Specimens examined.* Total, 23 larvae, as follows:

ORANGE CO., 1 mi. E O'Neill Park, Trabuco Canyon, *Peromyscus californicus*, 18 Nov. 1956 (9); Modjeska Canyon, *Peromyscus californicus*, 19 Jan. 1957 (2); *Peromyscus californicus*, 12 March 1957 (1). RIVERSIDE CO., 2¾ mi. W Corona, Tin Mine Canyon, *Neotoma fuscipes*, 17 March 1956 (8). 8 mi. SSE Lake Mathews, *Neotoma lepida*, 22 Dec. 1956 (3).

*Remarks.* This species is widespread throughout western United States, from California eastward to Kansas. Averages of scutal measurements of 4 specimens from Orange Co. are as follows: AW-50, PW-61, SB-21, ASB-23, PSB-7, AP-11, AM-26, AL-30, PL-42, S-32. The larvae were attached to the external auditory canal and the adjacent area of the ear pinna.

*Pseudoschoengastia occidentalis* Brennan

*Specimen examined.* Total, 1 larva, as follows:

RIVERSIDE CO., 3 mi. SW Lake Mathews, *Peromyscus maniculatus*, 23 Feb. 1957.

*Remarks.* The specimen from Riverside County represents a range extension of 285 airline miles from previous localities in Plumas and Monterey counties, California (Gould, 1956). Scutal measurements

of the single specimen are: AW-37, PW-57, SB-13, ASB-18, PSB-16, AP-27, AM-19, AL-15, PL-26. S-lacking.

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